

# **34<sup>th</sup> CCS Air Field Operations Flight (CYF) LOCKOUT/TAGOUT Procedures**



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| Annual Review Log    |           |           |
|----------------------|-----------|-----------|
| Name                 | Signature | Date      |
| MSgt Jose A. Alfonso |           | 19 Aug 99 |
|                      |           |           |
|                      |           |           |

## INTRODUCTION

This procedure establishes the minimum requirements for the lockout/tagout of energy isolating devices (circuit breakers, power boxes, etc.) IAW Air Force Occupational and Health (AFOSH) Standard 91-45. It shall be used to ensure that the machine or equipment is isolated from all potentially hazardous energy, and locked out and/or tagged out before qualified personnel perform any servicing or maintenance activities where the unexpected energization, start up, or release of stored energy could cause injury to personnel or damage to equipment. Most industrial accidents are caused by the uncontrolled release of hazardous energy. Many of these accidents can be prevented by proper lockout/tagout procedures. The Air Force's and OSHA's lockout/tagout standards are designed to prevent needless deaths and serious injuries to service and maintenance workers by controlling hazardous energy. To perform service and maintenance work on industrial equipment safely, you must understand the importance of energy control and the Air Force and OSHA's lockout/tagout program. You must also know how to apply energy isolation and lockout/tagout.

## WHAT IS LOCKOUT/TAGOUT

A lockout is a method of keeping equipment from being set in motion and endangering workers.

In lockouts:

- A disconnect switch, circuit breaker, valve or other energy isolating mechanism is put in the safe or off position.
- A device is often placed over the energy-isolating mechanism to hold it in the safe position.
- A lock is attached so that the equipment can't be energized.

In a tagout, the energy-isolating device is placed in the safe position and a written warning is attached to it.

The employer supplies all lockout and tagout materials.

Each device must be:

- Durable, to withstand wears.
- Substantial, so it won't come off easily.
- Capable of identifying the person whom applied it.
- Inspected periodically for serviceability

## WHEN SHOULD YOU LOCKOUT/TAGOUT?

Lockout/Tagout is necessary whenever you are performing service or maintenance around any machine where you could be injured by:

- Unexpected start-up of the equipment.
- Release of stored energy.

Two situations are most likely to need lockout/tagout.

- When you must remove or bypass a guard or other safety device.
- When you must place any part of your body where you could be caught by moving machinery.

Some jobs for which lockout/tagout should be used are:

- Repairing electrical circuits.
- Cleaning or oiling machinery with moving parts.
- Clearing jammed mechanisms.
- Blanking pipes where fluid or risk of engulfment is a hazard.

The Air Force and OSHA regulation lets each employer use lockout, tagout, or both. It's your responsibility to follow whichever system has been chosen for your workplace.

Locks and tags by themselves do not de-energize equipment. Attach them only after the machinery has been isolated from its energy sources.

## Areas that require the use of lockout/tagout procedures

- a. CHOT Site Facility (offices and equipment)
- a. AN/TPN-19 System UTC (ASR, PAR, OPS, 530 Shelter (maintenance)
- b. AN/TRC-176 UTC
- c. AN/MRC-144 UTC
- d. AN/TSW-7 UTC
- e. MET/NAV UTC

Specific procedures for embedded equipment items will be performed IAW the equipment technical orders.

Machines or equipment using a simple wall plug as the power source are not included as long as the supervisor or operator controls the plug.

### ENERGY

- Energy is movement or the possibility of movement.
- Whether the power switch is on or off, energy of some sort is always present in any powered equipment.
- Energy can come from many different sources, but it is always of two types:
  1. Kinetic energy—the force caused by the motion of an object.
  2. Potential energy—the force stored in an object that isn't moving.

### ENGINEERING

Some examples of protective engineering are:

- Machine guards
- Electrical disconnects
- Mechanical stops, such as pins and valves
- Engineering lockouts, which provide automatic protection against human error.

Any engineering safety feature can be defeated if you try.

- Never bypass an engineering lockout or let a co-worker do so.
- Never rely blindly on engineering safety features.

### EDUCATION

Your employer will use two methods to make sure you understand your units' lockout/tagout procedure.

- Documentation—a written statement of your units Energy Control plan
- Employee training—to help you understand how to use the Energy Control plan.

### Training.

The Supervisors will use these procedures and AFOSH Standard 91-45 as a guide to provide

Enforcement is necessary to make sure workers do their part in protecting their own safety.

- An inspection is to be conducted at least once a year to make sure energy control procedures are being carried out.
- Enforcement of safety rules must be fair and uniform.
- You should know what the consequences for failure to follow written procedures are.

### APPLYING ENERGY CONTROLS

- Energy isolation and locate/tagout are to be applied only by trained employees authorized to perform service or maintenance.
- Before lockout/tagout is applied, all employees who work in the affected area must be notified.
- The OSHA regulation requires that control of hazardous energy be done according to a six-step procedure.

#### 1. Preparation for Shutdown

Before you turn off any equipment in order to lock or tag it out, you must know:

- The types and amounts of energy that power it.
- The hazards of the energy.
- How the energy can be controlled.

#### 2. Equipment Shutdown

- Shut the system down by using its operating controls.
- Follow whatever procedure is right for the equipment, so that you don't endanger anyone during shutdown.

#### 3. Equipment Isolation

- Operate all energy-isolating devices so that the equipment is isolated from its energy sources.
- Be sure to isolate all energy sources—secondary power supplies as well as the main one.
- Never pull an electrical switch while it is under load.
- Never remove a fuse instead of disconnecting.

#### 4. Application of Lockout/Tagout

- All energy-isolating devices are to be locked, tagged or both according to unit plans.
- Only the standardized devices supplied by the shop is to be used for lockout/tagout, and are not to be used for anything else.
- Use a lockout device if your lock cannot be placed directly on the energy control.
- When lockout is used, every employee in the work crew must attach his personal lock.
- More than one employee can lock out a single energy-isolating device by using a multiple-

## 5. Control of Stored Energy

Take any of the following steps that are necessary to guard against energy left in the equipment after it has been isolated from its energy sources.

- Inspect the system to make sure all parts have stopped moving.
- Install ground wires.
- Release trapped pressure.
- Release the tension on springs, or block the movement of spring-driven parts.
- Block parts in hydraulic and pneumatic systems that could move from loss of pressure.
- Bleed the lines and leave vent valve open.
- Drain process piping systems and close valves to prevent the flow of hazardous materials.
- If a line must be locked where there is no valve, use a blank flange.
- Purge reactor tanks and process lines.
- Dissipate extreme cold or heat, or wear protective clothing.
- If stored energy can re-accumulate, monitor it to make sure it stays below hazardous levels.

## 6. Equipment-Isolating Verification

Take any of the following steps that fit your unit's equipment and energy control program.

- Make sure all danger areas are clear of personnel.
- Verify that the main disconnect switch or circuit breaker can't be moved to the on position.
- Use a voltmeter or other equipment to check the switch.
- Press all start buttons and other activating controls on the equipment itself.
- Shut off all machine controls when the testing is finished.

Location of the main power distribution points to be used as lockout/tagout points for facility and equipment.

Facility Main Input Power: The Facility Main Power Disconnect Circuit Breakers are located on the utility poles on the north side of the building near the door to the Commander's office.

System Power Distribution Panels: There are three panels located on the power pole the control power to the systems that are located in the fenced area. The circuit breakers on these panels will be used to lockout/tagout the equipment they control. The main circuit breaker on each panel may be used to isolate all equipment controlled by that panel.

There are several circuit breaker panels located in the facility that distribute power to the offices, environmental equipment, and exterior lighting.

## REMOVING LOCKOUT/TAGOUT

- Make sure the equipment is safe to operate.
  1. Remove all tools from the work area.
  2. Be sure the system is fully assembled.
- Safeguard all employees
  1. Conduct a head count to make sure everyone is clear of the equipment.
  2. Notify everyone who works in the area that: Lockout/tagout is being removed.
- Remove the lockout/tagout devices. Except in emergencies, the person who put it on must remove each device.
- In some workplaces, the last person to remove his lock may have extra duties.
  1. He may have to remove the hasp and lockout device.
  2. Tags should be removed, signed, and turned in.
  3. In some companies, the supervisor always removes his lock last.
- Follow a checklist of required steps to re-energize the system.

Restoring machines and equipment to normal operation.

- (1) After necessary maintenance is complete and the equipment is ready for normal operation, check area around the machine or equipment to ensure that no one is exposed to hazardous energy.
- (2) After all tools have been removed from the equipment, protective guards reinstalled, and personnel are clear, remove all lockout/tagout devices. Notify personnel that the locks and tags have been removed and the equipment is ready to be placed back in service. Operate the energy isolating device to restore power to the machine or equipment.
- (3). If more than one individual is required to lockout/tagout equipment, each shall install his or her personnel lockout/tagout device. When an energy isolating device cannot accept multiple locks or tags, a multiple lockout/tagout device (hasp) may be used.

## SPECIAL SITUATIONS

When contractors or other outside workers are performing service or maintenance at your workplace:

- The outside contractor and the on-site employer must exchange lockout/tagout information. Employees on site need to understand rules used by the other crew's energy control program.
- Be alert for new types of lockout or tagout devices.



- At many facilities, employees leaving work do not remove their locks until the ones arriving are ready to lockout.
- When the worker who applied a lock isn't there to remove it, the lock can be removed only in an emergency, and only under the direction of the supervisor.
- Many shops use the two-person rule.
- Never remove the lock without making sure it is absolutely safe.

#### Personnel Authorized to Sign LO/TO

Attached is a list of personnel at the 34th CCS/CYF facility authorized to perform Lockout/Tagout procedures.

- TSgt Snow (CYFT)
- TSgt Welch (CYFR)
- TSgt Roberts (CYFR)
- TSgt Stevenson (CYFM)

#### CONCLUSION

These procedures give you the tools you need to work safely around hazardous energy sources. It is up to you to guard your own life and health by putting these rules into action.

For specific guidance and information, reference AFOSH Std. 91-45, Hazardous Energy Control and Mishap Prevention Signs and Tags, and 29 CFR 1910.147, The Control of Hazardous Energy (Lockout/Tagout)

## REVIEW

- Lockout/tagout is a method of keeping equipment from being set in motion and endangering workers.
- The control of hazardous energy must be done according to a six-step procedure:
  1. Preparation for shutdown
  2. Equipment shutdown
  3. Equipment isolation
  4. Application of lockout/tagout devices
  5. Control of stored energy
  6. Equipment-isolation
- Before removing the lock:
  1. Make sure equipment is safe
  2. Conduct a head count
  3. Notify all affected personnel that lockout is being removed
- Special situations to be aware of:
  1. Outside contractors
  2. Temporarily reactivating equipment
  3. Servicing that lasts more than one shift
  4. Removal of lockout by personnel who did not apply it

QUIZ

1.     True   False   In a lockout, an energy-isolating device is locked in the safe or off Position.
2.     True   False   In a tagout, the energy-isolating device is placed in the safe position and a written warning is attached to it.
3.     True   False   A worker may use any sturdy lock to apply a lockout.
4.     True   False   Lockout/tagout should be used whenever you are performing service or maintenance around any machine where you could be injured by unexpected start-up or release of stored energy
5.     True   False   Each individual employee can decide whether to use lockout, tagout or both.
6.     True   False   Applying locks or tags in the right places de-energizes the equipment.
7.     True   False   Turning off the power switch removes all energy from powered equipment.
8.     True   False   Engineering safety features are fool-proof ways of protecting workers from hazardous energy.
9.     True   False   An inspection will be conducted at least once a year to make sure safety procedures are being carried out.
10.    True   False   Before lockout/tagout is applied, all workers in the affected area must be notified.
11.    True   False   Before you turn off equipment in order to lock or tag it out, you must know the type of energy it uses, the hazards of that energy and how to control the energy.
12.    True   False   Once you have isolated the system from its main power source, you can be sure no energy will reach the equipment.

- 15.    True    False    When you're finished testing equipment to verify that it has been isolated from its energy source, you must be sure to shut off all machine controls.
- 16.    True    False    Once energy isolation and lockout/tagout have been applied, you can be sure the equipment won't be re-energized while you're working on it.
- 17.    True    False    Before removing lockout/tagout devices, you must make sure the danger area is clear of tools and workers.
- 18.    True    False    When contractors perform maintenance in your workplace, you will be required to exchange your lockout/tagout procedures.
- 19.    True    False    If you have to temporarily re-energize equipment while you're working on it, you must re-apply energy isolation and lockout/tagout as soon as energy is no longer needed in the system.
- 20.    True    False    If a worker is not present to remove his own lock, any co-worker can remove it as long as he first makes sure it is safe.

ACKNOWLEDMENT OF TRAINING

I have been trained on and understand the working of Lockout/Tagout. I have also completed and passed the comprehensive quiz administered by a trained supervisor.

\_\_\_\_\_  
Employee's Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Trainer's Name

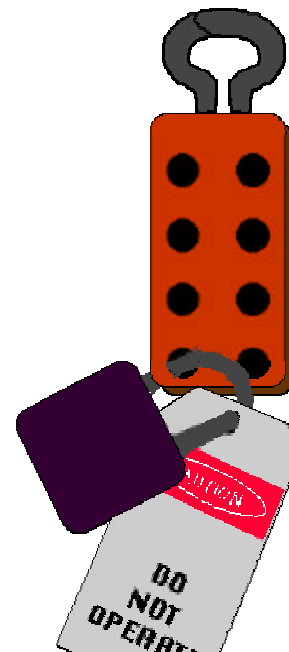
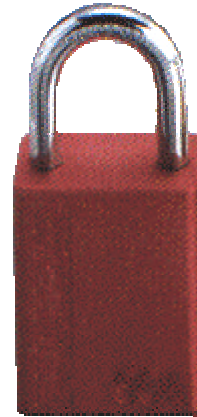
\_\_\_\_\_  
Date

Note: This form may be included in the member's personal training record. Retain this form until refresher training has been completed and documented. Initial and refresher training documentation will be tracked using AF Form 55.

## **Quiz Answer Key**

1. True
2. True
3. False
4. True
5. True
6. False
7. False
8. False
9. True
10. True
11. True
12. False
13. False
14. True
15. True
16. True
17. True
18. True

Examples of LO/TO Devices:



## How to Lockout/Tagout as per the procedure laid out in 1910.147

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### Applying the Lock/Tag

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#### Step 1-Before the Shutdown

THE STANDARD: (d)(1) "Preparation for shutdown." Before an authorized or affected employee turns off a machine or equipment, the authorized employee shall have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled, and the method or means to control the energy.

DISCUSSION: When developing these procedures, it may be helpful to have floor drawings and the assistance of the facility electrician and employees who work with the equipment. Keep in mind that lockout should be utilized if at all feasible. If you feel that you want to go with tagout, which I adamantly discourage, you must do so according to (c)(3). It is necessary to stipulate who is an "authorized" and who is an "affected" employee with respect to the procedures and equipment. Authorized employees are those who physically lockout/tagout equipment in order to perform servicing or maintenance on the equipment/machine. An affected employee is one who operate or uses equipment on which service or maintenance is performed under lockout/tagout or an employee who must work in an area in which such servicing or maintenance is performed. Both affected and authorized employees must be trained according to .147(c)(7).

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#### Step 2-Powering Down

THE STANDARD: (d)(2) "Machine or equipment shutdown." The machine or equipment shall be turned off or shut down using the procedures established for the machine or equipment. An orderly shutdown must be utilized to avoid any additional or increased hazard(s) to employees as a result of the equipment stoppage.

DISCUSSION: Use the specific procedures for the individual unit of equipment. General procedures to cover all machines with one procedure is not acceptable unless the criteria of .147(c)(4)NOTE: *Exception*. Equipment that is operated by cord and plug will not require written procedures for LO/TO in most cases; however, be sure that the employees are trained on the hazards of the specific equipment and that the plug/power source is to be in their control at all times (have 'em put the plug in their pocket).

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#### Step 3-Isolating the power source

THE STANDARD: (d)(3) "Machine or equipment isolation." All energy isolating devices that are needed to control the energy to the machine or equipment shall be physically located and operated in such a manner as to isolate the machine or equipment from the energy source(s).

DISCUSSION: This step involves flipping a power switch, breaking a circuit, closing a valve, etc. If the equipment has more than one shutdown point, be sure that all are isolated from power.

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#### Step 4-Applying the Lock and/or Tag

THE STANDARD: (d)(4) "Lockout or tagout device application." (i) Lockout or tagout devices shall be affixed to each energy isolating device by authorized employees.

(ii) Lockout devices, where used, shall be affixed in a manner to that will hold the energy isolating devices in a "safe" or "off" position.

(iii) Tagout devices, where used, shall be affixed in such a manner as will clearly indicate that the operation or movement of energy isolating devices from the "safe" or "off" position is prohibited.

(A) Where tagout devices are used with energy isolating devices designed with the



devices must also be uniform in print and format). The devices must indicate the employee who applied the device. Each authorized employee should have an individual lock and key with duplicate keys in a supervisors office for emergency only use. Lockout devices must only be removable by bolt cutters or like equipment. Tagout devices must not deteriorate or become illegible and must be attached by material with not less than 50 lbs. of strength. Each tag must have a prominent hazard warnings such as "Do Not Start," "Do Not Open," "Do Not Close," "Do Not Energize," "Do Not Operate." Additionally, tags must identify the worker by name, including the date/time work began and the type of work being performed.

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### Step 5-Releasing Residual Energy

THE STANDARD: (d)(5) "Stored energy." (i) Following the application of lockout or tagout devices to energy isolating devices, all potentially hazardous stored or residual energy shall be relieved, disconnected, restrained, and otherwise rendered safe.

(ii) If there is a possibility of reaccumulation of stored energy to a hazardous level, verification of isolation shall be continued until the servicing or maintenance is completed, or until the possibility of such accumulation no longer exists.

DISCUSSION: After all LOTO devices have been applied, employees must ensure that no hazardous energy is still stored in the equipment or machinery. This kinetic energy may be found in flywheels, steam lines, hydraulic systems, springs, capacitors, etc. Energy may need bleeding from capacitors or grounded from electrical circuits. Steam lines and hydraulic and pneumatic systems need activated to determine all energy has been released. Additionally, any water, chemical, sewer, or other liquid lines need emptied, e.g. block and bleed.

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### Step 6-Try to Power Up

THE STANDARD: (d)(6) "Verification of isolation." Prior to starting work on machines or equipment that have been locked out or tagged out, the authorized employee shall verify that isolation and de-energization of the machine or equipment have been accomplished.

DISCUSSION: This step requires the employee to turn all controls of the equipment or machinery in the "ON" position to ensure that all energy sources have been isolated and that it will not start up while work is being performed on it. Before trying to power up, be sure that no one is near the equipment or machinery in case the equipment should operate. Lastly, the employee should verify that the isolation point cannot be moved to the "ON" position. The employee can then perform his servicing or maintenance.

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## Removing the Lock/Tag

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### Step 1-Machine and/or Equipment Inspection

THE STANDARD: (e)(1) "The machine or equipment." The work area shall be inspected to ensure that nonessential items have been removed and to ensure that machine or equipment components are operationally intact.

DISCUSSION: After the authorized employee has performed his work, he must ensure that all tools, spare parts, debris, etc. have been removed from the area. Any guards that were removed to perform the work must be put back into place so that the equipment is safe to operate.

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### Step 2-Give Notification to All Employees

THE STANDARD: (e)(2) "Employees." (i) The work area shall be checked to ensure that all employees have been safely positioned or removed. (ii) Before lockout or tagout devices are removed and before machines or equipment

been developed, documented and incorporated into the employer's energy control program. The employer shall demonstrate that the specific procedure shall include at least the following elements:

- (i) Verification by the employer that the authorized employee who applied the device is not at the facility;
- (ii) Making all reasonable efforts to contact the authorized employee to inform him/her that his/her lockout or tagout device has been removed; and
- (iii) Ensuring that the authorized employee has this knowledge before he/she resumes work at that facility.

DISCUSSION: Except in emergencies and in the exception mentioned in (e)(3), above, each device must be removed by the person who placed it. When more than one person has applied a lock, the last person to remove his lock should remove the hasp or other multiple lockout device. When everyone has removed his lock and the machine/equipment is determined to be operating safely, the other workers can be notified that the equipment is now operable.

Lockout/Tagout Log

1. BUILDING: \_\_\_\_\_

2. WHAT IS LOCKED OUT/TAGGED OUT LOCATION (BE SPECIFIC):

\_\_\_\_\_

3. NAME OF EMPLOYEE AUTHORIZING LOCKOUT/TAGOUT:

\_\_\_\_\_

4. NAME(S) OF AFFECTED EMPLOYEE(S) AND HOW NOTIFIED:

\_\_\_\_\_

5. LOCATION OF ENERGY ISOLATING MEANS (BE SPECIFIC):

\_\_\_\_\_

6. TYPE(S) OF STORED ENERGY - METHOD TO DISSIPATE OR RESTRAIN:

\_\_\_\_\_

7. METHOD SELECTED (LOCKS, TAGS, ADDITIONAL SAFETY MEASURES). INCLUDE I.D. NUMBER OF LOCKS, TAGS:

\_\_\_\_\_

8. EQUIPMENT CHECKED TO ENSURE DISCONNECTION - INCLUDE DATE/ NAME/TITLE OF PERSON MAKING CHECK(S):

\_\_\_\_\_

9. NAME OF EMPLOYEE AUTHORIZED FOR GROUP LOCKOUT/TAGOUT, WORK BEING PERFORMED:

\_\_\_\_\_

10. SPECIAL INSTRUCTIONS: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ AUTHORIZING SIGNATURE

12. EQUIPMENT, CIRCUIT, SYSTEM PLACED BACK IN NORMAL SERVICE:

DATE: \_\_\_\_\_

\_\_\_\_\_  
SIGNATURE OF EMPLOYEE

CLEARING LOCKOUT/TAGOUT

#### LOCKOUT/TAGOUT AUDIT

1. DATE: \_\_\_\_\_

NAMES OF INSPECTORS:

A. \_\_\_\_\_

B. \_\_\_\_\_

2. LOCATION OF LOCKOUT/TAGOUT MANUAL:

\_\_\_\_\_

3. FINDINGS: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4. CORRECTIVE ACTION REQUIRED: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

5. SIGNATURES:

\_\_\_\_\_

\_\_\_\_\_